

REMARKS

The present Amendment amends claims 1, 2, and 5-20, and leaves claims 3 and 4 unchanged. Therefore, the present application has pending claim 1-20.

Priority

The Examiner acknowledged Applicants' claim for foreign priority under 35 U.S.C. 119(a)-(d). However, the Examiner's assertion that the certified copy was filed in the parent application is incorrect. It should be noted that the certified copy was filed in the present application (Application No. 10/811,923) — not in the parent application as asserted by the Examiner.

Therefore, Applicants respectfully request the Examiner to accurately acknowledge Applicants' claim for foreign priority, noting that the certified copy was filed in the present application.

Specification

The Examiner objected to the abstract of the disclosure, citing informalities. Where appropriate, Applicants have amended the abstract. Therefore, these objections are overcome and should be withdrawn.

The Examiner objected to the disclosure, citing minor informalities. Where appropriate, Applicants have amended the specification. Therefore, this objection is overcome and should be withdrawn.

Additional amendments were made to the specification to correct minor typographical errors. These amendments do not include any new matter.

Claim Objections

The Examiner has objected to claims 1-20, citing informalities. Where appropriate, Applicants have amended the claims. Therefore, this objection is overcome and should be withdrawn.

35 U.S.C. §112 Rejections

Claim 12 stands rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. This rejection is traversed for the following reasons. Applicants submit that claim 12, as now more clearly recited, fully complies with the enablement requirement. More specifically, the subject matter of claim 12 is described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Claims 1-20 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as the invention. This rejection is traversed for the following reasons. Applicants submit that claims 1-20, as now more clearly recited, fully comply with the requirements of 35 U.S.C. §112, second paragraph. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Further regarding the 35 U.S.C. §112, second paragraph rejection, the Examiner asserts that the Examiner was not able to determine the subject matter

that Applicants regard as the invention, and uses the features of claim 1 as an example of the alleged similar deficiencies of claims 1, 2, 6-14, 16, 17, 19, and 20. However, the cited features of claim 1 are not necessarily found in each of the other rejected claims. Therefore, if the Examiner persists in this rejection of claims 1-20, Applicants respectfully request that the Examiner specifically point out and distinctly cite features of each rejected claim that render that claim indefinite.

35 U.S.C. §102 Rejections

Claim 12 stands rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,173,377 to Yanai, et al. ("Yanai"). This rejection is traversed for the following reasons. Applicants submit that the features of the present invention, as now more clearly recited in claim 12, are not taught or suggested by Yanai, whether taken individually, or in combination with any of the other references of record. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Amendments were made to the claims to more clearly describe features of the present invention. Specifically, amendments were made to the claims to more clearly describe that the present invention is directed to a method for transmitting a command to a volume in a disk controller as recited, for example, in independent claim 12.

The present invention, as recited in claim 12, includes a method for transmitting a command to a volume disk controller. The method includes a step of extracting from a volume pair list all volume pairs having at least one different

identifier of an adapter, where the first volume is a copy source or a copy destination, the volume pair list registers one or more of the identifiers of the first volume and registers one or more of the identifiers of the adapter, and each of the volume pairs is a remote copy target in the disk controller. The method also includes a step of issuing a command for forming a logical path between two adapters included in the extracted volume pair. The prior art does not disclose all these features.

The above described features of the present invention, as now more clearly recited in the claims, are not taught or suggested by any of the references of record, particularly Yanai, whether taken individually or in combination with any of the other references of record.

Yanai discloses a remote data mirroring system. However, there is no teaching or suggestion in Yanai of the method for transmitting a command to a volume in a disk controller, as recited in claim 12.

The Yanai system includes two data storage systems interconnected by a data link for remote mirroring of data. Each volume of data is configured as local, primary in a remotely mirrored volume pair, or secondary in a remotely mirrored volume pair. Normally, a host computer directly accesses either a local or a primary volume, and data written to a primary volume is automatically sent over the link to a corresponding secondary volume. The Yanai system is illustrated in Fig. 1.

One feature of the present invention, as recited in claim 12, includes a step of extracting from a volume pair list all volume pairs having at least one different identifier of an adapter. Another feature includes where the volume pair list registers

one or more identifiers of the first volume and one or more identifiers of the adapters. Yanai does not disclose these features. To support the assertion that Yanai discloses a list of volume pairs, the Examiner cites Fig. 12, items 291-294. As shown in Fig. 12, and as described in column 32, line 45 to column 33, line 6, Yanai merely discloses a log file 291 and data file 292 of primary volume 295, and a log file 293 and a data file 294 of secondary volume 296, where primary volume 295 and secondary volume 296 are a remotely mirrored volume pair. The log files and data files of Yanai are quite different from the claimed volume pair list that registers one or more identifiers of the first volume and one or more identifiers of the adapters, as claimed. Furthermore, neither the cited text nor any other passages of Yanai teach or suggest extracting from a volume pair list all volume pairs having at least one different identifier of an adapter, as claimed.

Yet another feature of the present invention, as recited in claim 12, includes a step of issuing a command for forming a logical path between two adapters included in the extracted volume pair. Yanai does not disclose this feature. To support the assertion that Yanai discloses this step, the Examiner cites Fig. 12, items 240 and 241, Fig. 4, item 231 (adapters), and column 5, lines 43-50. The Examiner further asserts that a logical path must exist in the Yanai system because the system is software controlled, and that the communication link between the two mirrored pairs comprises a logical path through a physical link. However, as previously discussed, Yanai does not disclose extracting volume pairs from a volume pair list, in the

manner claimed. It follows that Yanai does not disclose issuing a command for forming a logical path between two adapters included in an extracted volume pair.

Therefore, Yanai fails to teach or suggest “extracting from a volume pair list all volume pairs having at least one different identifier of an adapter” as recited in claim 12.

Furthermore, Yanai fails to teach or suggest “wherein the volume pair list registers one or more of the identifiers of the first volume and registers one or more of the identifiers of the adapter” as recited in claim 12.

Even further, Yanai fails to teach or suggest “issuing a command for forming a logical path between two adapters included in the extracted volume pair” as recited in claim 12.

Therefore, Yanai fails to teach or suggest the features of the present invention as now more clearly recited in the claims. Accordingly, reconsideration and withdrawal of the 35 U.S.C. §102(b) rejection are respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the references used in the rejection of claim 12.

Claim 13 stands rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0081096 to Martin. This rejection is traversed for the following reasons. Applicants submit that the features of the present invention, as now more clearly recited, are not taught or suggested by Martin, whether taken individually or in combination with any of the other references

of record. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Amendments were made to the claims to more clearly describe features of the present invention. Specifically, amendments were made to the claims to more clearly describe that the present invention is directed to a command transmitting method of a volume in a disk controller as recited, for example, in independent claim 13.

The present invention, as recited in claim 13, provides a command transmitting method of a volume in a disk controller. The method includes a step of transmitting first route information including an identifier of a first disk controller to a second disk controller, where the second disk controller has a logical path to the first disk controller. The method also includes transmitting, to the first disk controller, second route information including an identifier of the second disk controller, by the second disk controller which receives the first route information. Another step includes adding the first and second route information to a route list in the first disk controller by the first disk controller that receives the second route information. The prior art does not disclose all these features.

The above described features of the present invention, as now more clearly recited in the claims, are not taught or suggested by any of the references of record, particularly Martin, whether taken individually or in combination with any of the other references of record.

Martin discloses a method and device for extracting usable lengths of fibre channel links. However, there is no teaching or suggestion in Martin of the command transmitting method of a volume in a disk controller as recited in claim 13.

The Martin device converts between the trunked and untrunked transmission of Fibre Channel frame data and provides connections using longer distance links. During conversion, the device manages the flow of frame data in both the egress (i.e., from Fibre Channel ports to a non-Fibre Channel port) and ingress (i.e., from a non-Fibre Channel port to Fibre Channel ports) directions. In the egress direction, the device operates as a FIFO to transmit all frames received from the Fibre Channel ports to the non-Fibre Channel ports. In the ingress direction, every frame received by the non-Fibre Channel port is stored in one of up to four storage segments based on the frame data's virtual circuit and path number identifiers. Frames are transmitted out of each storage segment in the order in which they are received.

One feature of the present invention, as recited in claim 13, includes adding the first and second route information to a route list in the first disk controller by the first disk controller that receives the second route information. Martin does not disclose this feature. To support the assertion that Martin discloses this feature, the Examiner cites claim 22. The Examiner infers that "there has to be a communication method wherein communication between the controllers and the storages are sharing the configuration information and identifier to indicate the path or the route so that when the data is being transferred in response to a request, it will not be transmitted to a wrong destination." The Examiner further infers that "there must be

a list of route or path so that the command and request are being sent properly amongst the storage devices.” First, the Examiner is reminded that for a reference to anticipate a claim, the reference must teach every element of the claim. The Examiner has not cited any portion of Martin that supports the assertion that Martin discloses adding the first and second route information to a route list, as claimed. Furthermore, the inferences of the claimed features, as alleged by the Examiner, do not necessarily result in adding the first and second route information to a route list, in the manner claimed. It is not necessary for Martin to include a route list, as asserted by the Examiner. For example, a command may include route information from one device to another, but there is not necessarily a route list to which first and second route information are added, in the manner claimed. Nonetheless, even if it were deemed necessary to include a route list, there is no teaching or suggestion in Martin of adding the first and second route information to a route list located in the first disk controller by the first disk controller that receives the second route information, in the manner claimed.

Therefore, Martin fails to teach or suggest “adding the first and second route information to a route list in the first disk controller by the first disk controller which receives the second route information” as recited in claim 13.

Accordingly, Martin fails to teach or suggest the features of the present invention, as now more clearly recited in the claims. Accordingly, reconsideration and withdrawal of the 35 U.S.C. §102(e) rejection are respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the references used in the rejection of claim 13.

35 U.S.C. §103 Rejections

Claim 15 stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0178328 to Honda, et al. ("Honda") in view of U.S. Patent Application Publication No. 2004/0004966 to Foster, et al. ("Foster"). This rejection is traversed for the following reasons. Applicants submit that the features of the present invention, as now more clearly recited in claim 15, are not taught or suggested by either Honda or Foster, whether taken individually or in combination with each other in the manner suggested by the Examiner. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Amendments were made to the claims to more clearly describe features of the present invention. Specifically, amendments were made to the claims to more clearly describe that the present invention is directed to a command path control method of a disk controller as recited, for example, in independent claim 15.

The present invention, as recited in claim 15, provides a command path control method of a disk controller. The method includes receiving a remote copy command with a transmittal function and holding, from a first disk controller, route information indicating an identifier of a second disk controller which can transmit the remote copy command. The method also includes determining an identifier of the

first disk controller and an identifier of a third disk controller, wherein the third disk controller includes a volume as a transmittal destination of the remote copy command. Another step includes obtaining, from the route information, the identifier of the third disk controller that includes the volume as the transmittal destination of the remote copy command. The method also includes transmitting the remote copy command to the second disk controller indicated by the route information. Another step includes transmitting the remote copy command to the third disk controller via the second disk controller. The prior art does not disclose all these features.

The above described features of the present invention, as now more clearly recited in the claims, are not taught or suggested by any of the references of record. Specifically, the features are not taught or suggested by either Honda or Foster, whether taken individually or in combination with each other in the manner suggested by the Examiner.

Honda discloses a control method used in a RAID1 storage subsystem. However, there is no teaching or suggestion in Honda of the command path control method of a disk controller as recited in claim 15.

Honda is directed to a control method used in a RAID1 storage subsystem, which includes a plurality of storage devices. The storage subsystem processes an access request from a host computer with the cooperation of the plurality of storage devices of the storage subsystem. Each storage device of the RAID1 storage subsystem includes a unit for sharing an access request from the host computer, and a unit for determining if the storage device should process the shared access

request. The storage device further includes a unit for transferring write data, which is transmitted from the host computer to the storage subsystem to at least a storage device that should process it.

One feature of the present invention, as recited in claim 15, includes receiving a remote copy command with a transmittal function. Honda does not disclose this feature. To support the assertion that Honda discloses this feature, the Examiner cites paragraph [0221]. However, as described in the cited text, Honda merely discloses that an access request command is issued from a host computer to a storage subsystem. An access request command is quite different from a remote copy command with a transmittal function, as received in the present invention. Furthermore, there is not teaching or suggestion of remote copying at all in Honda, as in the present invention.

Another feature of the present invention, as recited in claim 15, includes holding, from a first disk controller, route information including an identifier of a second disk controller which can transmit the remote copy command. Honda does not disclose this feature. To support the assertion that Honda discloses this feature, the Examiner cites page 12, paragraph [0024] (it appears that the Examiner intended to cite paragraph [0224] instead, as paragraph [0024] does not appear on page 12). However, as described in the cited text, Honda merely discloses a plurality of storage devices perform command reception and retransmission processing. This is not the same as holding, from a first disk controller, route information including an identifier

of a second disk controller that can transmit a remote copy command, as in the present invention.

Yet another feature of the present invention, as recited in claim 15, includes determining an identifier of the first disk controller and an identifier of a third disk controller, where the third disk controller includes a volume as a transmittal destination of the remote copy command. Honda does not disclose this feature. To support the assertion that Honda discloses this feature, the Examiner cites page 12, paragraph [0226], further asserting that "1-N is equivalent to the third storage device which comprises a controller." However, as described in the cited text, Honda teaches where the storage devices share an access request from the host computer without starting access request transfer processing. This direct receipt of the access request from the host computer to each of the storage devices appears to teach away from the present invention, where a remote copy command is routed from the host computer to a disk controller, and where appropriate, from the disk controller to another disk controller, until the end of the route is reached. Furthermore, there is not teaching or suggestion in Honda of determining an identifier of the first disk controller and an identifier of the third disk controller including a volume as a transmittal destination of the remote copy command, as in the present invention.

Still yet another feature of the present invention, as recited in claim 15, includes obtaining, from the route information, the identifier of the third disk controller that includes the volume as the transmittal destination of the remote copy command. Honda does not disclose this feature, and the Examiner has provided no citations to

support the assertion that Honda discloses this feature. Furthermore, as previously discussed, Honda does not disclose receiving a remote copy command, as claimed. As such, it follows that Honda does not disclose obtaining, from the route information, the identifier of the third disk controller that includes the volume as the transmittal destination of the remote copy command, as claimed.

Another feature of the present invention, as recited in claim 15, includes transmitting the remote copy command to the second disk controller indicated by the route information. As conceded by the Examiner, Honda does not disclose this feature.

Yet another feature of the present invention, as recited in claim 15, includes transmitting, via the second disk controller, the remote copy command to the third disk controller that includes the volume as the transmittal destination of the remote copy command. Honda does not disclose this feature. As previously discussed, Honda's direct receipt of the access request from the host computer to each of the storage devices appears to teach away from the present invention, where a remote copy command is routed from the host computer to a disk controller, and where appropriate, from the disk controller to another disk controller, until the end of the route is reached (see paragraph [0226]).

Therefore, Honda fails to teach or suggest "receiving a remote copy command with a transmittal function" as recited in claim 15.

Furthermore, Honda fails to teach or suggest “holding, from a first disk controller, route information including an identifier of a second disk controller which can transmit the remote copy command” as recited in claim 15.

Even further, Honda fails to teach or suggest “determining an identifier of the first disk controller and an identifier of a third disk controller, wherein the third disk controller includes a volume as a transmittal destination of the remote copy command” as recited in claim 15.

Still even further, Honda fails to teach or suggest “obtaining, from the route information, the identifier of the third disk controller that includes the volume as the transmittal destination of the remote copy command” as recited in claim 15.

Further, Honda fails to teach or suggest “transmitting the remote copy command to the second disk controller indicated by the route information” as recited in claim 15.

Furthermore, Honda fails to teach or suggest “transmitting, via the second disk controller, the remote copy command to the third disk controller that includes the volume as the transmittal destination of the remote copy command” as recited in claim 15.

The above noted deficiencies of Honda are not supplied by any of the other references, particularly Foster. Therefore, combining the teachings of Foster with Honda still fails to teach or suggest the features of the present invention, as now more clearly recited in the claims.

Foster discloses a method of using virtual identifiers to route transmitted data through a network. However, there is not teaching or suggestion in Foster of the command path control method of a disk controller as recited in claim 15.

In Foster's method, virtual identifiers can each be assigned to one or more paths through a network to a destination, such as by a network manager for the network. An appropriate virtual identifier for routing a data communication can also be identified in various ways, such as by registering the data communication with a network manager for the network and receiving an appropriate virtual identifier in response. A virtual identifier identified for a data communication may also be assigned to a path of one or more destinations that are selected as being appropriate in various ways, including selecting destinations that do not include a destination specified by a source of the communication.

Foster's method, which is in a field entirely different from that of the present invention, is nonanalogous art. As provided in MPEP 2141.01(a), a reference relied upon under 35 U.S.C. §103 must be analogous prior art. Specifically, "the reference must either be in the field of Applicants' endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). The U.S. Patent and Trademark Office classified Foster's storage subsystem under Multiplex Communications (Class 370). This class has no relationship to the subject matter of the present invention, which has been classified under Electrical Computers and Digital Processing Systems: Memory (Class 711). Therefore, Applicants submit that

Foster is not in the field of Applicants' endeavor. Furthermore, Foster is not reasonably pertinent to the particular problem with which the inventor was concerned. Therefore, this rejection should be withdrawn.

In addition to being nonanalogous art, Foster does not supply the deficiencies as previously discussed regarding Honda. Therefore, the combination of Foster and Honda does not provide the invention, as claimed.

For example, one feature of the present invention, as recited in claim 15, includes receiving a remote copy command with a transmittal function. Foster does not disclose this feature, and the Examiner did not rely upon Foster for teaching this feature.

Another feature of the present invention, as recited in claim 15, includes holding, from a first disk controller, route information including an identifier of a second disk controller which can transmit the remote copy command. Foster does not disclose this feature, and the Examiner did not rely upon Foster for teaching this feature.

Yet another feature of the present invention, as recited in claim 15, includes determining an identifier of the first disk controller and an identifier of a third disk controller, where the third disk controller includes a volume as a transmittal destination of the remote copy command. Foster does not disclose this feature, and the Examiner did not rely upon Foster for teaching this feature.

Still yet another feature of the present invention, as recited in claim 15, includes obtaining, from the route information, the identifier of the third disk controller

that includes the volume as the transmittal destination of the remote copy command. Foster does not disclose this feature, and the Examiner did not rely upon Foster for teaching this feature.

Another feature of the present invention, as recited in claim 15, includes transmitting the remote copy command to the second disk controller indicated by the route information. Foster does not disclose this feature. To support the assertion that Foster discloses this feature, the Examiner cites paragraph [0049], which describes the use of a virtual identifier translation table. Foster does not teach or suggest a remote copy command or a second disk controller. Furthermore, Foster does not teach or suggest transmitting a remote copy command to a second disk controller indicated by the route information, in the manner claimed.

Yet another feature of the present invention, as recited in claim 15, includes transmitting, via the second disk controller, the remote copy command to the third disk controller that includes the volume as the transmittal destination of the remote copy command. Foster does not disclose this feature. There is no teaching or suggestion in Foster of transmitting a remote copy command to a third disk controller that includes the volume as the transmittal destination of the remote copy command, via the second disk controller, as claimed.

Therefore, Foster fails to teach or suggest "receiving a remote copy command with a transmittal function" as recited in claim 15.

Furthermore, Foster fails to teach or suggest “holding, from a first disk controller, route information including an identifier of a second disk controller which can transmit the remote copy command” as recited in claim 15.

Even further, Foster fails to teach or suggest “determining an identifier of the first disk controller and an identifier of a third disk controller, wherein the third disk controller includes a volume as a transmittal destination of the remote copy command” as recited in claim 15.

Still even further, Foster fails to teach or suggest “obtaining, from the route information, the identifier of the third disk controller that includes the volume as the transmittal destination of the remote copy command” as recited in claim 15.

Further, Foster fails to teach or suggest “transmitting the remote copy command to the second disk controller indicated by the route information” as recited in claim 15.

Furthermore, Foster fails to teach or suggest “transmitting, via the second disk controller, the remote copy command to the third disk controller that includes the volume as the transmittal destination of the remote copy command” as recited in claim 15.

Both Honda and Foster suffer from the same deficiencies relative to the features of the present invention, as recited in claim 15. Therefore, combining the teachings of Honda and Foster in the manner suggested by the Examiner does not render obvious the features of the present invention, as now more clearly recited in claim 15. Accordingly, reconsideration and withdrawal of the 35 U.S.C. §103(a)

rejection of claim 15 as being unpatentable over Honda in view of Foster are respectfully requested.

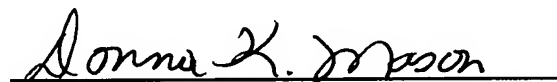
The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the references used in the rejection of claim 15.

In view of the foregoing amendments and remarks, Applicants submit that claims 1-20 are in condition for allowance. Accordingly, early allowance of such claims is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of Mattingly, Stanger, Malur & Brundidge, P.C., Deposit Account No. 50-1417 (referencing attorney docket no. 520.43709X00).

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.

A handwritten signature in cursive script, reading "Donna K. Mason", is written over a horizontal line.

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